

Chairman's Award - Team 3310

Team Number

3310

Team Name, Corporate/University Sponsors

Innovation First International / Special Products and Manufacturing / Metroplex Women's Care / The Boeing Company / Northeast Texas Chapter of AFA No. 416 / Texas Workforce Commission / FIRST in Texas / Rockwall Independent School District & Rockwall-Heath H S

Briefly describe the impact of the *FIRST* program on team participants with special emphasis on the 2016/2017 year and the preceding two to five years

Students on team 3310 credit their experiences in FIRST for teaching them engineering skills such as CAD and using tools such as CNC machines. But they also have learned life skills like leadership, professionalism, teamwork and giving back to the community. In the past 5 years, every single Black Hawk student has gone on to attend college with over 80% pursuing STEM careers. Our students mentor elementary robotics teams and our alumni have gone on to mentor other FRC teams.

Describe the impact of the *FIRST* program on your community with special emphasis on the 2016/2017 year and the preceding two to five years

Team 3310 has impacted the community by creating and mentoring robotics programs at all elementary schools in our district. We host three annual robotics tournaments where these students compete. We helped pass a bond in our district to create a top of the line STEM center. It is currently being constructed and all career and engineering classes will be moved there in 2019. Because of our team's efforts, all district students have an opportunity to get a advanced STEM-based education.

Team's innovative or creative method to spread the *FIRST* message

The Black Hawks believe it is important to spread the FIRST message by: -Running an interactive robot game at our school's homecoming pep-rally -Presenting our robot to elementary robotics students -Presenting our robot and achievements to sponsors -Showing our robot at the school career fair -Mentoring younger teams in our district - Attending national and state advocacy conferences with other FIRST teams -Inspiring legislators to improve STEM in our community and surrounding communities

Describe examples of how your team members act as role models and inspire other *FIRST* team members to emulate

During regionals and World Championships, Team 3310 sends students around the pits to make sure all robots pass inspection and are able to compete. In 2016, the Black Hawk's "Fix-It Crew" helped over 10 teams and received 3 thank-you letters for the help. One of the teams we helped came to the Hub City regional missing the wiring in their robot. Two students from 3310 helped them finish the robot and get it running on the field for their last scheduled match at the competition.

Describe the team's initiatives to help start or form other FRC teams

The Black Hawks meet with school administrators and teachers from other districts in North Texas to help establish FRC teams. We first explain what resources are required to establish a sustainable program. Then we identify potential funding and sponsors to financially support the team. Finally, our team works with new FRC programs to explain how to design and build the robot. We helped Red Oak robotics when they started and most recently have been assisting Farmersville and Terrell

Describe the team's initiatives to help start or form other *FIRST* teams (including Jr.FLL, FLL, & FTC)

To promote STEM, we focus on attracting younger students to robotics. We introduced FLL and recently VEX IQ programs in all 12 elementary schools. We also introduced the VEX program to the district middle schools. The program has expanded greatly at all three middle schools in our district. There are more than 150 students involved in elementary and middle school robotics this season. This year we hosted three successful robotics tournaments for teams in the Dallas area.

Describe the team's initiatives on assisting other *FIRST* teams (including Jr.FLL, FLL, FTC, & FRC) with progressing through the *FIRST* program

For the 2017 STEAMWORKS game, we collaborated with Team 148 to build a full field with all game elements. We are helping to host scrimmages on Saturdays for teams from all over Texas. Because we are recognized for our programming excellence, we have also provided programming assistance to multiple *FIRST* teams at all levels. Additionally, we have led workshops for new FLL mentors on how to run a team. This has improved retention rate of mentors and FLL mentors are now helping our FRC team.

Describe how your team works with other *FIRST* teams to serve as mentors to younger or less experienced *FIRST* teams (includes Jr.FLL, FLL, FTC, & FRC teams)

This year returning team members individually mentored 23 different elementary and middle school robotics teams. We helped the teams design, build, program, and prepare their robots for competition. Additionally, Black Hawks students collaborated with Team 1296 to run a Jr. FLL camp for 1st through 6th graders. During the two week camp, we introduced the elementary students to STEM concepts using LEGOs by helping them design, build and program their Lego "creatures".

Describe your Corporate/University Sponsors

Black Hawk Robotics initially relied on our school district and parents to fund the program. Realizing this was not sustainable, we implemented a business team in 2016. The business team students meet with community businesses to raise awareness of our team and pursue sponsorships. Through our community outreach, we have greatly increased sponsorship over the last two years. This year we gained eleven additional sponsors and over \$10,000 in additional donations.

Describe the strength of your partnership with your sponsors with special emphasis on the 2016/2017 year and the preceding two to five years

Team 3310 sponsors are crucial to the success of our program; therefore, we work hard to create mutually beneficial relationships. Over the last few years our sponsors have been so impressed by our team that they decided to partner with our robotics program to establish student internships. These internships help students get hands on experience in an engineering workplace as well as supplying our sponsors with well qualified, hard working engineering and marketing students.

Describe how your team would explain what *FIRST* is to someone who has never heard of it

The Black Hawks describe *FIRST* as the only robotics program that encompasses every facet of business and technology careers. We like to think of our team as "a little company" that other teams can emulate. Through the program, students learn the value of media and marketing, are challenged to solve engineering problems, promote science and technology, grow their professionalism and sportsmanship, and develop leadership and communication skills while making friends and having fun.

Briefly describe other matters of interest to the *FIRST* judges, if any

Team 3310 Black Hawk Robotics thanks the judges for their time.

Team Captain/Student Representative that has double-checked this submission.

Madison Drake

Essay

History

Team 3310, the Rockwall-Heath Black Hawks, originated in 2010 when a single student, interested in technology, approached a science teacher about starting a robotics team. The teacher did not have experience in robotics but was impressed with the student's enthusiasm and agreed to coach the team. FRC Team 3310 began our initial season with thirteen members. Our team immediately began promoting the need for technology programs in the district. To achieve sustained success, we now focus on increasing awareness and generating excitement for a program dedicated to promoting STEM in our high school, district, and community.

Impact Within Our Schools

When our school first opened in 2005, there were no technical programs. In 2010, the Black Hawks coach convinced the

school to let her teach a basic engineering class. Every year students on the robotics team worked with our coach to recommend new technology classes to the school administration. Due to the team's efforts, the original engineering class grew into a full four-year technology curriculum. The curriculum includes engineering, advanced engineering, robotics, automation, and practicum classes. Practicum allows students to get class credit and real world experience interning at STEM oriented companies. The skills these students gain from their internships give them practical experience in their desired fields of study and make them more attractive to potential colleges and employers. Four of our FRC team sponsors provide internships through the practicum program.

To promote STEM and create a pipeline of students for future teams, we have focused on recruiting younger students into robotics programs. During our off-season, we started FLL teams in our district's grade schools. What started as one team has exponentially expanded, resulting robotics programs in all 12 elementary schools in our district. We also helped introduce the VEX robotics program at the middle schools. To support these programs, we host FLL and VEX camps every summer. In 2016 we started a program where all returning Black Hawk upperclassmen mentor other robotics team. Because of this initiative, the number of robotics teams has increased to 30 with over 150 students involved.

Over the past two years we have run and hosted 3 annual robotics tournaments. We organize the tournament so elementary students only compete against other elementary students and middle school students only compete against other middle school students. We feel that this contributes to a more positive experience for the students because they are competing against students of their own age and skill level. By starting and supporting robotics teams in all the district schools, we have created a pipeline of students to sustain the program. The majority of our new members have had direct robotics experience on other teams or in engineering classes that we helped establish.

Because of the new technology classes in our high school, and the increasing number of teams in our district, the school board recognized that we needed a larger, dedicated facility for STEM education. The Superintendent even had our team demonstrate our robot and explain our curriculum to the board team drafting the proposal. A bond was approved by the community which, in part, funded the creation of a new STEM center, which is scheduled to open in the 2018-2019 school year. The center will house the technology programs for the school district and will have a machine shop and a dedicated practice field for our robotics programs.

Impact Within Our Community

One of the primary goals for team 3310 has always been to involve and educate our local community about STEM education. Since its inception, Black Hawk Robotics has introduced itself into the community in a variety of ways. The team believes that community involvement is just as important as building a winning robot and participating in competition. Our team's community service efforts go to providing holiday dinners to families in need and teaming with other Rockwall organizations such as "A Million Meals" for a greater impact. Our robotics team is also known to help students and teachers at our school. For example, members of our team have designed and manufactured a lightweight tray holder so that wheelchair-bound students can move through the line more comfortably, without having to hold the lunch tray.

As part of our outreach efforts to promote awareness and support of robotics in our community we have developed a business team. Our business team takes our robots to local businesses and manufacturing companies. We give demonstrations of what we've learned, the robots we've built, and discuss the team robotics process. This year we have increased the number of sponsors from 15 to 26 and raised an additional \$10,000 in funds.

Impact Within FIRST and STEM

Essay - page 2

As we have grown as a program, we have looked for ways to promote FIRST and STEM. Students from 3310, along with 200 members from 30 FRC teams representing 14 states, traveled to Washington D.C. to attend the annual National Advocacy Conference. The purpose of this trip was to emphasize the importance of STEM education to Congress. During our time there, we attended seminars to improve our speaking skills and to gain knowledge on how STEM can be incorporated into education programs throughout the nation. In particular, we learned about the Elementary Secondary Education Act (ESEA). Ultimately we met with three Texas Congressmen and one Senator at Capitol Hill to explain why we believe that ESEA should be adopted. The ESEA bill was passed in December 2015 with bipartisan support. This legislation is essential to help school districts allocate funds towards extracurricular, mentor-based STEM programs, such as FIRST.

While at NAC we realized that we could make more of an impact at the state level. So the Black Hawks worked with other FIRST teams to form the STEM Advocacy Conference of Texas (SACOT). In October we traveled to Austin to help

plan the platform for SACOT, listen to keynote speakers, and meet with Texas Representatives to advocate for more funding and recognition for STEM in rural districts. In January, team members participated in the first SACOT Annual Conference where we again met with our representatives and advocated for the Classroom Connectivity Initiative, House Bill 395, and House Bill 595.

Last year Team 3310 began a program called the "Fix-It Crew," which assists other teams at regional and world competitions with anything from building to programming to lending parts, so that teams can pass inspection and be able to compete in their matches. This helps ensure that every team can enjoy the whole experience of competition. Last season, we helped over 10 teams wire and program their robot, assemble drivetrains and pass inspection.

Impact Within Our Team

While the Black Hawks have made strong contributions to our school, community, and FIRST, we have made the largest impact within our team. We have improved our team by involving everyone in the designing, building and programming processes. In the past, new team members sometimes felt they were not provided the same opportunities as returning members. We strive to have equal representation between men and women on the team. In fact, both of the 2017 captains are women that joined the team as freshmen. We also focus on mentoring new members to improve their skills and understanding of the team.

We have also improved our team by having students take on more responsibility. Students now lead meetings and all major off season activities. For example, our student-led business team raised a substantial portion of this year's budget without any mentor help. Their efforts included going to businesses and presenting team information to recruit new sponsors. Additionally, students lead sub-teams that develop prototypes, plan for scouting, and handle media and marketing. Before we formed sub-teams, everyone would be working on the same thing at once. This caused delays in finalizing the robot design and inefficient use of team members. This year, we had multiple sub-teams prototyping at the same time, so we were quickly able to determine which robot components worked best and move on to the robot design.

The Black Hawks have transitioned from an inexperienced rookie team with a handful of members to an established program of 45 students. Now we are more organized and more inclusive of all team members. In our early years, when a class graduated, we were left with gaps within the program. Now when our seniors graduate, we replenish instead of rebuild. Strong foundational skills developed through the program allow the team to thrive even when the most experienced team members' graduate. Our strong and dedicated group of students has achieved success on the field too. The Black Hawks have won Regionals the past five seasons and have successfully competed at World Championship. We are proud of our many Design, Controls, Imagery, and Engineering Excellence awards.

As we begin our 8th year, we're proud to share our story. From the very beginning, our team had the vision to promote STEM by introducing an engineering and robotics curriculum in our school. This resulted in the launch VEX and FLL teams in our elementary and middle schools. This foundation has helped us grow the program so we could go beyond just working on a robot to have sub-teams focused on media, business, technology, and most important - promoting STEM in our district and community.